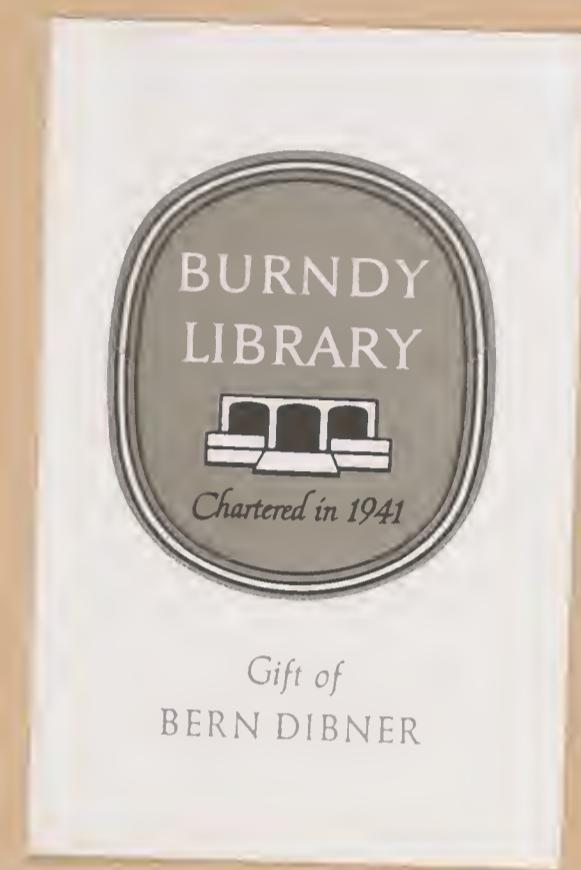


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ON THE PRINCIPIA. MSS.

73 NEWTON (Isaac) and CLERKE (Gilbert). Four Autograph Letters signed, from Gilbert Clerke to Isaac Newton, concerning difficulties in *The Principia* and one Autograph Letter signed from Isaac Newton in reply, written on the blank pages of one of Clerke's letters. Six pages folio and five pages 4to, in Clerke's hand, 1 1/2 pages, 4to, in the hand of Isaac Newton. 1687 £90

A most important contemporary correspondence between these great scientists, following immediately on the publication of Newton's "Philosophiae Naturalis Principia Mathematica." Clerke was one of the best known mathematicians of the time, the author of "De Plenitudine Mundi," 1660; "Tractatus de Restitutione Corporum," 1662; "Finalis Concordia"; "Oughtredus Explicatus"; a comment on Oughtred's "Clavis Mathematica," 1682; etc.; etc.

Clerke writes to Newton at considerable length, saying that he has just read his book and wishes to have a number of points explained. Newton replies: "I do not wonder that in reading a hard Book you meet with some scruples & hope that ye removal of those you propound may help you to understand it more easily." He goes on to explain the proposition which Clerke has queried, and ends: "I thank you for signifying your doubts to me in these things because they might have proved my mistakes. If there be anything else you think material for me to know or stick much at in reading ye Book, pray do me ye favour of another letter, or two. I am Your most humble servant Js. Newton."

The work of 17th Proposition proceeds thus. The equation first found is $SP1 - 2KPH + PH9 = (SP9 + 2SPH + PH9 - L \times SP + PH)$. ~~By~~ ~~addition~~ striking off ~~2KPH + L × SP + PH - SP1 - PH9~~ & ~~of first by striking out the terms SP1 & - SP9, 2KPH & 2KPH, PH9 & PH9 will become L × SP + PH, for equation will become SP1 - 2KPH + PH9 + 2KPH + L × SP + PH - SP9 - PH9 = SP1 + 2SPH + PH9 - L × SP + PH + 2KPH + L × SP + PH - SP9 - PH9: & by striking out of terms (SP1 - SP9 & SPH & PH9 will destroy one another there will remain L × SP + PH = 2SPH + 2KPH.~~

By sesquiplicata of mean sesquiplicata, a ratio & an half or of root of y^c ratio triplicata. for in Cor. 2 dem. XI, the sides DB, ~~DB~~ are in a duplicate ratio of y^c sides AD, Ad & therefore of triangles ADB, AdB wh^{ch} are in a triplicata ratio of y^c sides AD, Ad are in half that ratio of y^c sides DB ~~DB~~ is this half of y^c triplicata ratio of same call ratio sesquiplicata. ~~See~~ ^{now in} Prop. XV Et the three proportionals be A. B. $\frac{B^9}{A} \equiv$ & AB will be of rectangle sub axibus & this is compounded of y^c ratio sesquiplicata $\sqrt{A^c}$ & y^c triplicata ratio $\sqrt{\frac{B^9}{A}}$ for ~~the~~ compounded $\sqrt{A^c} \times \sqrt{\frac{B^9}{A}} = \sqrt{A^c \times \frac{B^9}{A}}$ ~~is~~ $\sqrt{A^9 \times B^9} = AB$.

I thank you for signifying your doubts to me in these things because they might have prov'd my mistakes. If there be any ^{thing} else you think material for me to know or stick much at in reading of Book, pray do me y^c favour of another letter, or two. I am

Your most humble Servt
Is. Newton.

ISAAC NEWTON.
[Part of A.L.S.].

\$ 450⁰⁰

ON THE PRINCIPIA. MSS.

73 NEWTON (Isaac) and CLERKE (Gilbert). Four Autograph Letters signed, from Gilbert Clerke to Isaac Newton, concerning difficulties in *The Principia* and one Autograph Letter signed from Isaac Newton in reply, written on the blank pages of one of Clerke's letters. Six pages folio and five pages 4to, in Clerke's hand, 1 1/2 pages, 4to, in the hand of Isaac Newton. 1687 [redacted]

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128

CLARKE (GILBERT) FOUR A.L.s. to Newton concerning
Difficulties in the "PRINCIPIA", 4 $\frac{1}{2}$ pp. sm. 4to and 5 $\frac{1}{2}$ pp.
folio (one letter stained)

Stamford, 26 Sep., 10 Oct., 7 Nov.
21 Nov. 1687.

The first letter contains also an AUTOGRAPH DRAFT, SIGNED,
OF NEWTON'S REPLY, giving a detailed explanation of the
17th proposition:

"I do not wonder that in reading a hard Book you meet with
some scruples and hope ye removal of those you propound
may help you to understand it more easily I thank you for
signifying your doubts to me in these things because they
might have proved my mistakes"

Worthy S^r

I have a desire to acquaint you with something I
have observed in your booke & wh^{ch} may be your intent to
know; though I confesse I doe not as yet well understand
so much as your first three sections, for w^{ch} you doe not
require y^e l^e a man shoudt be mathematice doctor; but it
I must not tell you, till I understand those sections & your
third booke very well; perhaps I must never tell you
yr booke coming to me in yr evening of my declining age.
it is in propol. 17. p. 59. Lem: 15. where you say adderis ut obliqua
you adder KpH. but on one side & L + S ~~+~~ + PH, but once
on y^e one side & twice on y^e other, upon w^{ch} your con-
cluding analogism doth depend. & if the equation
should be rightly reduced it woulde be
$$2Sph + 2Kph = 2SpH + 2Kph.$$

now I am writing, let me tell you my thoughts of prop. 15.
where you say, atq^{ad} adeo rectangulum sub axibus &c.
by fessiquiplicⁱ. it appears from Cor. 2. Lem: 11. yt you
meane y^e same with triplicate so Ac³ is y^e triplicate of A³
or fessiquipl. of Ag³ and by dimidiation you meane y^e root
or p. 59. l. 3. & certainly by integra ratio, you meane A³
if I mistake yr meaning, may let me know in a word
or two: let therefore the three proportiones be
A. B. $\frac{Bq}{A}$::

A. B. will be y^e rectang. sub axibus: but I doe not see how
this will be compounded of Ac³ + r $\frac{Bq}{A}$ = r Agc Bq.
but if Ac be drawne into y^e latus rectum viz $\frac{Bq}{A} \frac{Ac}{A} = \frac{Bq}{A} \frac{Ac}{A}$
w^{ch} is y^e rectangle sub axium quadratis
consider whither you might not here make some accountal mistake.

of y^2 one rectangle for y other.

There are one or two things more in wh^{ch} I am
not well satisfied, But y^e shell being yet upon my head
it may be too great a presumption in me to say any
more to so able a man as you are in yt owne profession
if it be not so already, to have said so much, for which
I crave yr Pardon. At rest

Ex: yr most humble servant

from my house in

St Martin in Stamford

Gill. Clarke

u. Sept.

I have sent this letter by Mr Lawrence by some of
the postmen, and may return with

thth by whom if you see cause you may return me
and answer.

the most marginal

third in a set of starting line songs.

1920-1921

1888. A hand of 6

I do not wonder that in reading ^{a hard} my Book you will
be some perplexed & hope of removal of those you
pound may ~~enable~~ help you to understand it more easily

The work of yt 17th Proposition proceeds thus. The equation first found is $SP^9 - 2KPH + PH^9 = (SH^9 \&c =) SP^9 + 2SPH + PH^9 - L \times \overline{SP + PH}$. ~~By~~ ~~addition~~ also ~~bigg~~ $2KPH + L \times \overline{SP + PH} - SP^9 - PH^9$, & ~~if~~ ~~first~~ ~~part~~ ~~of~~ ~~the~~ by striking out the terms SP^9 & $-SP^9$, ~~the~~ ~~$2KPH$~~ & ~~$+ 2KPH$~~ $+ PH^9$ & $-PH^9$ will become $L \times \overline{SP + PH}$, for equation $+ 2KPH + PH^9 + PH^9$ will become $SP^9 - 2KPH + PH^9 + 2KPH + L \times \overline{SP + PH} - SP^9 - PH^9$ will become $SP^9 - 2KPH + PH^9 + 2KPH + L \times \overline{SP + PH} - SP^9 - PH^9 = SP^9 + 2SPH + PH^9 - L \times \overline{SP + PH} + 2KPH + L \times \overline{SP + PH} - SP^9 - PH^9$: & by striking out ~~if~~ terms ~~the~~ ~~$SP^9 - SP^9 + 15$~~ $-PH^9$: & by striking out ~~if~~ terms ~~the~~ ~~only~~ $L \times \overline{SP + PH}$ will destroy one another there will remain $L \times \overline{SP + PH} = 2SPH + 2KPH$.

$= 2SPH + 2KPH$.
 By sesquiplicata of mean sesquialtera, a ratio & an half
 or if root of γ^e ratio triplicata. for γ in Coroll. 2 Lem.
 XI, the sides DB, AB are in a duplicate ratio of γ sides
 AD, Ad & therefore of triangles ADB, Adb wh^{ch} are in a triplic-
 ate ratio of γ sides AD, Ad are in half that ratio of
 γ sides DB, AB if this half of γ triplicate ratio of these
 call ratio sesquiplicata. ~~Three~~ ^{now in} Prop. XV let
 the three proportionals be $A. B. \frac{B^9}{A} \doteq$ & AB will
 be of rectangle sub axibus & this is compounded of γ
 ratio sesquiplicata $\sqrt{A^e}$ & ~~the~~ ^{edipunctata} ratio $\sqrt{\frac{B^9}{A}}$ for ~~three~~
~~base compounded~~ $\sqrt{A^e} \times \sqrt{\frac{B^9}{A}} = \sqrt{A^e \times \frac{B^9}{A}} \doteq \sqrt{A^9 \times B^9} =$
 AB .
 The ratio being double to one in this

AB.
I thank you for signifying your doubts to me in these
things because they might have proved my mistakes. If there
be any thing else you think material for me to know or stick
much at in reading of Book, pray do me y^e favour of another
letter or two. I am
Yours affly Comand

Your most humble servant
J. Newton.

for Mr Isaac Newton
fellow of Trinity Coll:
in Cambridge

H. H.
do

DSI

S²

I graunt, and am very glad, that you have justified your proposition, and did verily believe you would, but I had thought it must be ^{by} reason of misprinting or mis-
-writen scribbling; as it is; I thinke it may be reasonably ex-
-cused, for although I did looke upon y^a rest of y^a Equations,
yet finding no fault in them, nor seeing any $\{ L. h. \}$ there I
forbare to make any strict search, nor dor I thinke my selfe
bound to take foure quantities & goe & by you with four
or 5 equations, y^at went before, but as is usual ~~but as is~~
that I goe next way to these w^{ch} are on both sides of
ye next note of equation, and if as you dor now you had
hooked in y^a intermediate equations with Lunular or expri-
-mally if you had said at last

$SPq - 2kPH + c = SPq + 2SPH$ &c. you had written
hor ev^t. $SPq - 2kPH + c = SPq + 2SPH$ &c. you had written
better to be understood & I thinke you will graunt me thus much
some other obscurities & some what else I am not so well satisfied
in) I will tell you another time, because you will dor me y^e favor
to accept a letter or two more for it I thank you.

I perceive I collected rightly from Lem. ii Cor. 2. y^at the way
y^e Jesquint. of Ag^m by y^a n. & a. & by analogy with y^e same
might have collected y^a & Ac. was y^e Jesquint. of A. v. 7.
A in & A = v^r Ac, but by a slip of fancy when I came to mac-
hise 4. put y^e Jesquint. of Ag v. 3. &c. for y^e Jesquint. of A. or
y^e Ag in h. In h. & you say you meant Ag & that indeed
will bee, But

first what ever you say by Jesquint. you mean Jesquint. a
ratio and a ratio y^a if not v^r Ac. for it A to 4 is 1 to 4
altara is 6. but d = v^r Ac. I thought you might mean
that $\frac{A}{2} + \frac{A}{2}$ but that would not dor. I also much prefer
y^e whole by the halfe i.e. $A + \frac{A}{2} = Ag$ Had you

now I perceive I should have multiplied yr whole note by
ye halfe, but by yr ratio diminuta viz. $A \times v.A = v.A$.

againe, how can you say
The sides DB. D^b, are in a duplicate ratio of ye sides AD. Ad
& therefore ye triangl AD. A^b which are in a triplicate
ratio of ye sides AD. Ad. are in halfe yr ratio of yr sides BD. B^d.
How can that be: how but halfe $= \frac{BD}{Bd}$ is not the
triplicate more than yr whole duplicate & as much more
as $\frac{BD}{Bd}$ is when it is multiplied by $\sqrt{\frac{BD}{Bd}} = \sqrt{\frac{BD^c}{Bd^c}} =$
to ye trianglos $\frac{AD^2B}{A^2db}$.

Lastly you say & this halfe of ye triplicate ratio I
then call ratio of triplicate - you call ye ratio well
as you use it, but here you wrong your selfe, for you
had call yr whole triplicate viz. A^c. yr sesquip. of A^a
(that is BD. Bd. & not $\frac{A^c}{2}$)

But so long as yr propositions, published are safe, no
matter how you or ⁱⁿ private letter may miscall
or mistake, by a sudden flash of fancie, for I know
H. so well evry body else yt you not need not my
help to teach you these Hintz: But I see so much already
I shall need yr assistance for more proposition, & corollaries
than I will be care in civilitie & for had yr booke come
to me 20 or 30 years ago, I woudt have taken more
paines than now I can: But now I have begune I will
try a little to get some general notions about yr
planis & yds I w^t

in most humble farrt: G. Clarke
et morhun
Octob. 3. 81

Gib. Clarke

I confess I did not very well approve of your calling y^e root
by y^e Dimidiate ratio; for dimidiate is properly to divide by 2.
so Ought. c 15, 11. si dimidiandum sit rc 32, vel dividendum p 2.
so Clavius lib. 5. toward y^e beginning de proportionis - unitalem
qua ex parte dimidiate numeri binarii; therefore I thought that
for most mens understanding, this ratio had been better called
sub-duplicata; but if use amongst you virtuosi hath autho-
rized y^e other way because there is as well 4×4 as $4 + 4$
I am content.

ye carrier went sooner by my window than usually, & since
I read yr 15th prop. l: 3. p. 420. & then you say - Diuiniti trans-
verso sunt in ratione *sesquialterā* tempore periodi; I am sure if
if I had not knowne what sesquicuplicata was, I should never have
found it out by comparing these two propositions. for if one
of those be in sesquialtera of other is not. I thinke it had
been better & more easie to be understood, if it had been called
subsesquicuplicata; so Clavius a little before de ratione minoris
in qualitate. - non ut autem sic *divisio manus* ex. neg. enim radem

est proportionis $4 : ad^2 : qud. 2. ad^4$.
I thinke y^t wch you mean by sesquipl. should have a name for it
& y^t sesquipl. is a good name. but it cannot be allowable to
call it sesquialtera, there being a knowne ratio by addition
as $\frac{3}{2}$ is in another thing so called: by all meandy let divers
things have divers names.

Oct: 10. 1687

28
Cambridge
Massachusetts
Nov 11 1841

061

52
I thinke in my last, I tooke notice of yr maine of what you now write viz:
of both addition & multiplication. But when particular quantities are
named & set downe, it is another thing, than if a man being asked in
general, what is halfe ye duplicate ratio, should answer, that, that
ratio is compounded of two equal ratios, wh being twice taken, one of
them may in yt regard be called halfe of it. But you say
" ratios, are summd up by multiplication, & if cannot graunt, they
are compounded by multiplic: w giveth y^e fact not y^e summe"
" you say, y^e quantity $\frac{1}{4}$ doubled is $\frac{3}{2}$, but ye ratio $\frac{1}{4}$ doubled is $\frac{1}{2} \times \frac{1}{4}$
or 16. certainly mathematicians doe not use to call that doubling
but duplicating in contradistinction to doubling.
but y^e ratio dimidiate of $\frac{16}{1}$ is yr root therof namely $\frac{1}{2}$
I thinke ratio subduplicata is a more cyp. more usual & better knowne word
so y^e quantitas sesquialtera of 16 or $\frac{16}{1}$ is 24. true! & so is yr
ratio also; for I doe not believe yt any mathematician did ever yet
call 64. y^e sesquialtera of 16. But yr triplicate of 4. yr Duplicate
of 8. y^e double of 32. & you have given a good name, yr
sesquiplicate of 16. and perhaps there is $A + \frac{A}{2}$ for yr sesqui-
altera, so then may be use of $A \times \frac{A}{2} = \frac{Aq}{2}$. for y^e sesquialtriplicate
you say. let y^e quantity be A & its ratio A to 1. or A y^e quantitas
dimidiate, duplicata, triplicate, sesquialtera will be $\frac{1}{2}A$ $2A$ $3A$ $\frac{3}{2}A$
But y^e duplicata triplicate sesquialtera will be $\frac{1}{2}A$ $2A$ $3A$ $\frac{3}{2}A$
any man called 2A. But Aq y^e duplicate of A. & I am persua-
ded not one Mathem: in ten but wold say & being asfd, y^e t. is y^e
sesquialtera of 4. without y^e least thought of distinguishing it. in y^e
quantitas of ratios, so Clavius proportion sesquialters - $\frac{3}{2}$ $\frac{6}{4}$ $\frac{9}{6}$ &c p. 360
& you cannot done, but that so it is by addition & in lib. 5
signification famosis. as there is on y^e one side of y^e simple ratio,
dupla, tripla &c & on y^e other side subdupla, subtripla &c
so on y^e one side there is duplicata, triplicate &c & on y^e other side
sub-duplicata, subtriplicate &c whch are sufficient & need no innovation.
to be short, when I will graunt you, y^e dupla in y^e same with duplicate
then I will graunt you y^e sesquialtera in y^e same with sesquiplicate
y^e like I say of yr explanations in lines.
you say you did not runne over particular: but pray once againe consider
whether these triangles according to your ownd way of calling ratio's
be in halfe y^e ratio of y^e sides BD, bd. it is in dimidiate ratione
or as y^e roots therof: they are in sesquiplicate ratione laterum DB, db.
it is A not Ac if it is in dimidiate ratione thought y^e Aq:
I say if a little before you wrote, you of multiplying DB, db
& DB. id est by y^e halfe, wh rame you upon y^e mistake; you see
I am confident to what pray dismount my confidence. your letter answer very
pretty to what I said of a sudden & of a sudden & of fancy for you date
your letter at y^e top of a page nov. 2. & at y^e bottom you slip
downe just a weeke latering it nov. 9. wh if read: nov. 4.
are nature must be subject to such things in matter of greater

if I say in duplicata ratione & meane composition or multipli: of ratios
well I may for ye word is dedicated to that use & I have another word
(viz) dupla to expresse ye double: but it by ~~les~~ ^{les} ~~que~~ ^{que} ~~alib~~ ^{alib} I meane
composition of ratios; what word have I left ^{but} ~~but~~ ^{que} ~~que~~ ^{alib} in by addition?
as 6. 4 to 4. & then what a tribe of fesqui's have I to coyne
words for, when I say fesqui quinta & must be thought to moane
5. 6. but by no meane $\frac{5}{5} \times \frac{1}{5}$: but I must say fesqui quinuplicando
5. 5. or ex ratione comp. pila ex or last of all $\frac{1}{5}$

By yr way another h[er]e when you are at loopen pray tell me how
you understand fesqui altera (in yr tables p 403. 404. for I came
of a suddaine adiust you, neither my way nor your way.

But lett us come to some new matter. I was much troubled, at yr conjuncti
rationibus, by wh I perceive you meane multipli: viz: p. 51. L. 6. how to find
PC + L: a 4th proportional, at last I ferd it was but a method of
writing & no analogism, to contracting ye ratio by changing ye
Quadr's. & letting $\frac{y}{x}$ in rank & place one under another, & easily saw
how I was to multiply & divide

L.R. Lpu :: AC. PC

Lpu. Gup :: L. Gu. &c.

and indeed you shoule
have sett you so, for yr booke is hard enough, make it as easie
as you can: so then shoule have been two pick'd lines from ye
center to ye tangent in prop. 5. p. 44. & you shoule have had
marginal references ~~to~~ to Eucl. & Apoll. & been prudigal of
per this & per that, of yr temp[er]e & quoniam's & enlarged yr
scholium: but your master doe not consider ye infirmities
of yr reader, except you intended to write only to profissours
or intended to have yr booke lie, moulding in library or
other men to gett yr credit of yr invenzioni; the corollaries
in your 4th prop. want a great many word: & believe ye absolute
truth of yr & think I beginne to understand how from Definith
& lemma 10th you ground y^e relative or corollarie nature of them
upon yr reciprocall ratio of times & velocities (not yr common one, when
y^e circle or line must of necessity be y^e same for periodical times &
velocities reciprocē: as in a horse-race, w^{ch} because it so easily often
it selfe shoule have been obviated) but you meane of planetary
motions, though yr prop: is de aquabili motu & deince of heavy
bodies, by yr axis or sutable in yr ellipse. I doubt I may
betray my ignorance, I would you woulde bestow a line or two
of explanation, I doubt not but four such Gyants
as you are have made yr coroll: sun: no question of yr
but I doe not understand what circles have to do with cubes
y^e will be done in lines w^{ch} will not be done in numbers
& I know I have used unmeet numbers but pray let me shew
& perhaps by numbers y^e velocities shoule rather be reciprocē in
you how diminuta ratione radionum: as thus

Cor. 6. si quadr. Temp. ut Cubi radior

$$4 \frac{16}{tempor} :: 729.2916. \left\{ 9.15 \frac{54}{721} erunt radij. vel rad. cub: \right. \\ \left. erq. radij. 2 \frac{4}{tempor} :: 27.54. \right.$$

dimidicata ratio radionum $\frac{3}{4}$ fac

quoniam peripheria sunt ut radij. si primum Corpus in uno die
in legram absolvit periodum peripheria. q. alterum in uno die planet
tamen semiprem peripheria est tempora quia tempora sunt ut 27. ad 54
et velut tales sunt peripheria: temp. 15. $\frac{54}{721}$ est. $\frac{7}{751}$ fac 8.

$$erq. 9. 8. :: 3. 4. quod absolv. est enim 9. 8. :: 3. 2 \frac{2}{3}.$$

proprias accedit recipit.

$$9. 8. :: fac 4. 3.$$

$$I tried it also in 9. 36 :: 64. 256. \frac{cub.}{quadr. Temp.} \text{ & it came to } 4. 3 \frac{20}{27} :: 2. 2 \frac{2}{5}.$$

but ne fator ultra cypida, I have long livd in an obscure
village in worldy busynesse & failde: reuerations & have not been
acquainted with y^r braver notions of Galileo, Huygenius &c & do so
know as much as would suffice my selfe well, but I would willingly
other phenomena; you must give me leave to talke though
it be not very good sense, for I am one of yr forfathers
I will be bold to say of Dr Barrow & I contributed neare
40 years since, as much or more thane any two others to
spreake modestly in disbus illis to bring these things into pl
in yr university. I rest yr Humble Servaunt

Gib: Perke

St martins. Nov. 7. 1687.

I thought I must understand yr <sup>11th fact. ch I have read
y^r doe not depeine of understanding yr <sup>11th fact. w^{ch} I have read
w^{ch} I will defin when I understand it, with a little of yr helpe
better how to tell you what I understand a little more & know
I looked over some of yr foregoing frictions & thought I could
under stand y^r but they would take up too much time & would
be easilly lost: as I experienced in two or three prop.</sup></sup>

1/11
for me. Frank Newton
Fellow of Trinity College
in Cambridge

Robert

St. Martin's, Nov. 21. - 47

S^r
I troubled you with a tedious letter about a fortnight ago
and must crave your pardon for one more, you may answer
at your owne leisure & discretion: presently after yr letter was
gone, I found my error about yr ^{presently} letter was
intending to multiply 23. by 23. for yr 4th jovial, my eye had
rarely upon yr 3^d jovial & multiplied by 113. so all was well
since I see how you take *sesqui altera* in c. 40: where you
explane yr selfe clearly. I have forgot how Archimedes labored
it in his 2^d & 3^d Cyl. but certainly as yr world now goes
being you have another word (viz. *supplicata*) for composition
or multiplication of reasons. it was best to cleave wholly to
yt & leave yr other ^{to be done} in case of addition only: but I submit to
yr judgment; being confident yt as to yr *binarios* Lem. II. Cor. 2
upon reflection you will not say yt they are in halfe yr ratio
of yr sides *Bh* i.e. in *dimidiala ratione* or as radices: I now
beginne to perceive yr ^{bd} mane of yr hypothesis of equal ponderation
& will leave farther accuracie in things yt require labour &
time; till some other season, but I must needs crave yr pardon
for one touch at *Parhys*; viz. concerning your lemma.

If your first lemma had been thus
Quantitatem ut et Quantitatem rationes, quae ad equalitatem dato tempore
in constantem tendunt, sunt ultimis & qualiter? Who could have denied it?
But then ye words dato tempore seem to make yr proposition identical: as if
it were said quantities wh^{ch} will be equal will be equal. & Asymptoty
will infinitely draw nearer & nearer ^{but though} to touch dato tempore
it had been concluded nullam habent ultimam differentiam & if upon this
si negarit earum ultima differentia d. ergo nequeunt proprieas accidere
quam ex data differentia d. contra hypothesim: who could deny it?
If not! then your Lemma cannot be admitted: for where as you
say, si earum ultima differentia d. it is already proved that there
is no such thing of mid all mathematicians have hitherto held yt
that there is no such thing as quantitas indivisibilis or ultima ratio
but you say ^{with} ultima ratio quacum evanescunt p. 35. w^{ch} determinos
nothing for wch of all these lines or any way doth yr angle A B C
evanescere ^A determine w^{ch} of those or any other you will a

lesse may be given. it therefore as one saith there is no point in opinion
can be made so, but it will have some longitude & latitudo: yet because
it is so little as not to be considerable in Demonstration, it may be taken for
indivisible: if it in philosophic demonstration, you had diminished ratios
till they has been in considerably unequal, you might wth ye consent of all
have taken proporcional & qualiter & equalib^y & yr discourse about ye
planets & syds has been as satisfactor & acceptable who will not be
ent if you bring such mighty things to yt scanning &c.

Lem. 6. dico quod Angulus sub chorda et tangentie continetur
in infinitum et ultimo evanescet. who would not graunt you this
forthwith as well as for any thing you have said, in Demonstration
of it - for whereas you say - ergo prior oblinet ut in coincidencie
that cannot be, for there is no line left coincidere.

Lem. 7. & so for yr 7th lemma, after corision of yr points A, B.
there will be no lines left for coincidencie: in great circles
a little part, is so near a straight line of such parts of anchor.
& their tangents, would be readily graunted you to be proportiona
equal & taken for such if need be but mathematically speaking
it being Demonstrated of a tangent, can touch an arch but in one point
therefore this cannot be allowed for strict Geometry: I wonder at
first of p. 4th prop. 10. & 20. you made $Q+P = Q+R$. & $PC = PF$. yet is ye
hypothomise to yr base till I remembred those Lemm. but however
such thing cannot passe for strict Geometric: nor in my opinion
need you defin it shoud be so accounted as you seeme to doe
p. 35 l: 5.

the like I say of yr 8th lemma. Conunctibus punctis A, B. Angulus
btd evanescet: true. & so will ye triangles RAB, RAB, RBD.
ye like I say of Lem. 9. for when B D C. are come to A. there will
be no triangelis ABD, ACE
for Lemma. 10. I see little said hitherto why you make those lines
exponents of times & velocities, except fro yr 7th definition.
(you expone ye velocity by PO of anck a prop. 16. I certainly this
noble lem. shoud have been ushow in with more wordz.

But in your 11th lem. seeing Ellipses are some of yr vastly differing
tri Cicles (& bee y^e never so neare) I doe not see how it can stand
you in much stead, for before you have finished your Demonstration
you must bring g. to G. & make AG. ye Diamete of yr cicle.
& so by yr 31. 3. 2: have thrust b. out of yr Ellipsis into yr said
circle with B. & then yr lines want junction with w^{ch} with w^{ch} you conclude
will not be same with yr nascentes with w^{ch} you begaine
if I may take liberarie to alter yr lines by diminishing quantitatis, how
unequal soever DR & ab, are; I can make yr equal, by making
AG. ye Diamete as afore, & then bringing c. usq ad C. for
CC minor esse potest quam quatuor assignatae

in yr 4th prop. you quote this lemma of yr lineola nascentes th ad de
wh^{ch} are easily and undeniably Demonstrable from Euclide to be as bta ad bda
& never y^e more Demonstrated by your 11th lemma, being both taken
in yr same cicle.

if you thinke any thing I have said worth yr repliing, doe it when
you find leasure, for no doubt but a great many doe often purpose to
you thing of greater consequence than my skil will afford. & if you can
without much trouble tell me any differing notions about yr 10th lem.
& 4th prop. & pray doe it & I shall v^e or not fit: say. G. Clarke
or any thing else

5th our carrier is very slow & careless in delivering letters
yr came to towne on thursday, but not delivered to me
till I had written every syllable apon, & was just going
to brake it to be soone enough for him
I perceivre we agree wel enough, but in a little verballity
as you say: yr writing of the & that way in short &
easily miſtaken; if you had ſaiſ in halfe ye triplicate ratio
of ye ſid or DB, db: I had readily understand you, but you
do not at all above mention yr triplicate ratio of ye ſid or
DB db: But of AD Ad; besides yr word (that) would
easily have carried a man to ye remoſt antecedent viz
ye ſid or DB db: first mentioned; but no more of that,
acknowledge this explication to be true; Ile affirme you did
you yr, not as a thing I thought you did not know, but as
I told you (in thiſ) of my ſelfe how I multiplied 23. by 13
to yt you need, now to ſpeak to nothing but what I have
ſaid of yr Lemma, & in whiſh Ile affirme you I ſpeak my mind
& not to carill, & it is my real opinion yr ſpeak my mind
doth not depend upon yr: of Geometrical Demonſtrations, therefore
I will expect no answer froſt you thiſ next weeke

yr ſir: G. Cl.

to this
for Mr. Frank Newton
Fellow of Trinity College
in Cambridge

not my

you fine
things
without me
at 4th p.m.

DS

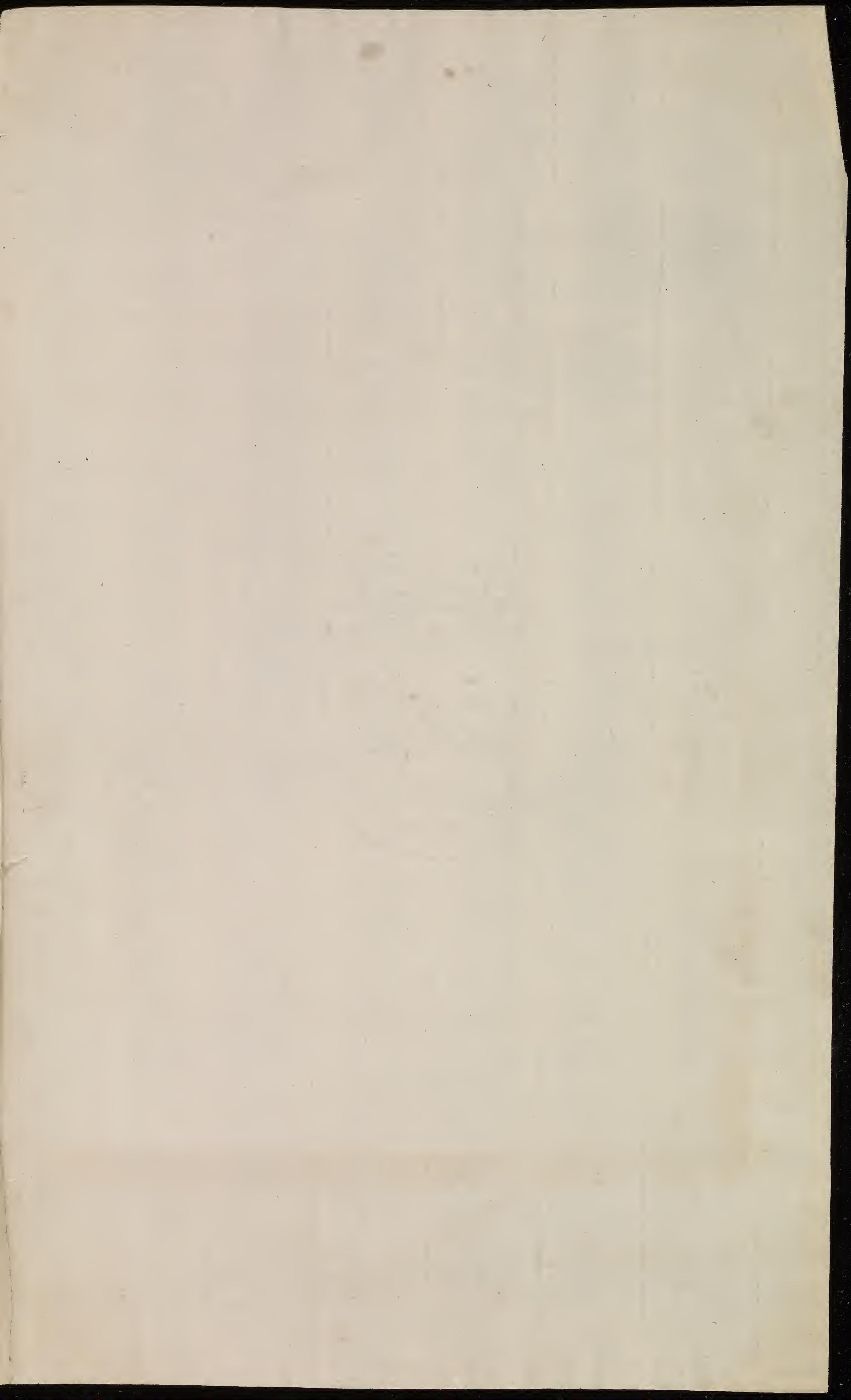
Letter from one Gilbert Clarke of
Hamford to Dr. J. A. Salterg forth the
difficulty he had to understand Dr
J. principle in one of v^{ch} there
is a copy of Dr J's answer where
he thanks him for laying his doubts
before him p^{ch} he says might have
found mistakes in him, & offers to
clear & explain them —

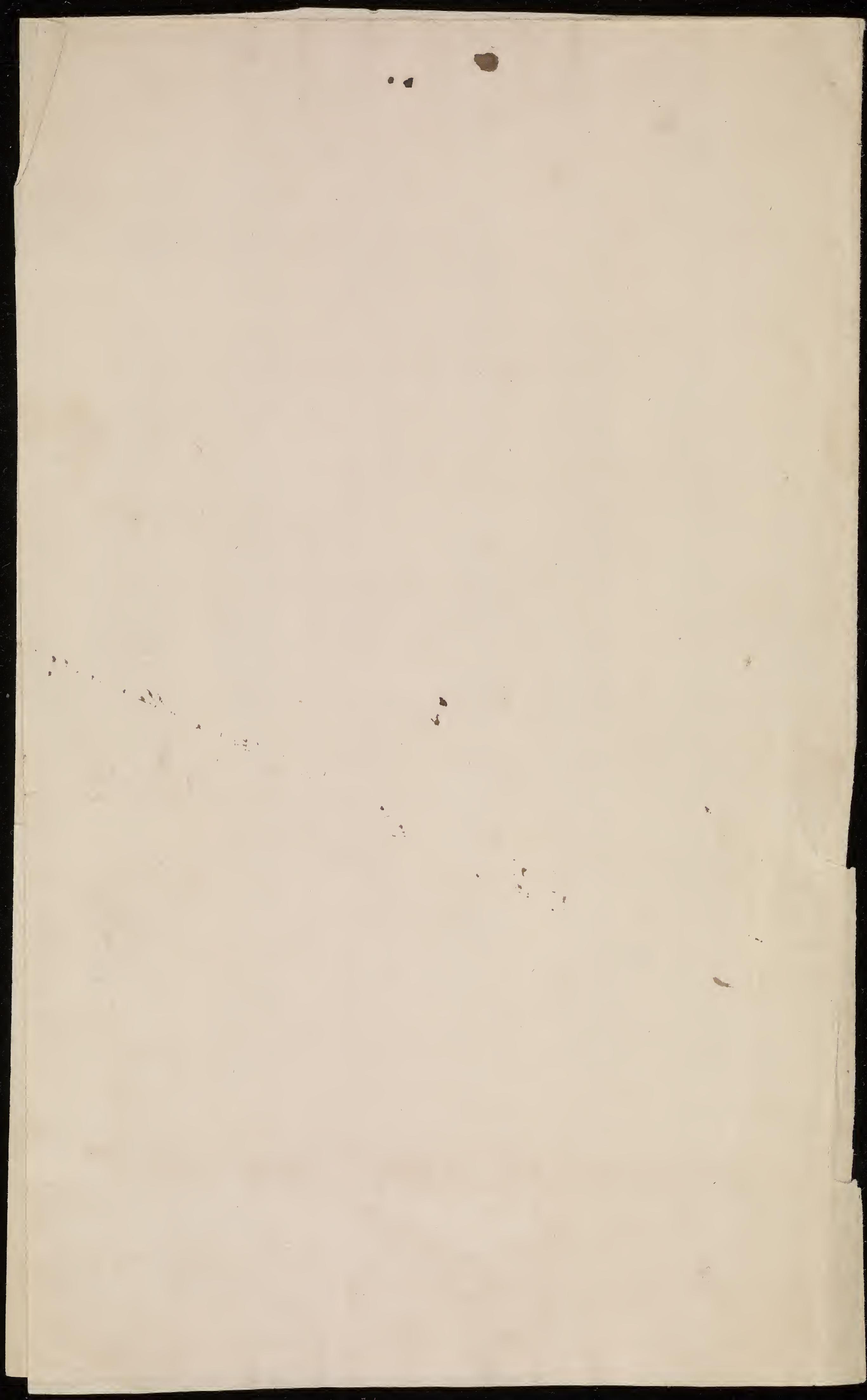
Dr. Who Gilbert Clarke was

N^o 7

Letters from Storer to
Dr Babington & Dr. N.

DSI





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